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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/993,496	11/27/2001	Tae-Duk Kim	1594.1017	8100

21171 7590 04/24/2003

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EXAMINER
SAYOC, EMMANUEL

ART UNIT	PAPER NUMBER
3746	7

DATE MAILED: 04/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Calculation
Detecting
- discover the
determine existing
presence, effect or

PTO-90C (Rev. 07-01)

Office Action Summary	Application No.	Applicant(s)	
	09/993,496	KIM, TAE-DUK	
	Examiner	Art Unit	
	Emmanuel Sayoc	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *amendments filed on 2/14/2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *3-5* is/are allowed.

6)☒ Claim(s) *1,2,6-10,15-21 and 27* is/are rejected.

7)☐ Claim(s) *11-14 and 22-26* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *14 February 2003* is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. This office action is in response to the amendments of 2/24/2003. In making the below rejections and/or objections the examiner has considered and addressed each of the applicants arguments.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 7, and 19, are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

First of all, the claims loosely make several and different references to "maximum amplitude." There is the limit or preset top dead point reference value, there is the detected maximum amplitude of the piston, and there is the maximum amplitude of the drive signal, which closely relates to the corrected amplitude of the piston. The applicant will find that the references to the amplitudes have been broadly interpreted. Thus, the applicant is encouraged to clearly state to what the maximum amplitude refers, and be consistent in his definition.

The phrase "resetting the current maximum amplitude by subtracting a preset/set maximum amplitude from a previous maximum amplitude so as to prevent the collision of the piston" line lines 10 and 3 of claim 7 and 19, respectfully, is ambiguous. What "maximum amplitude" is being referred to here? What is the "current maximum amplitude?" What is the

"preset maximum amplitude?" What is a "previous maximum amplitude?" What is a "preset/set maximum amplitude?" The subtraction procedure is ambiguous. For example, if a current amplitude reads 50, and a previous amplitude reads 49, does that mean the resulting amplitude is 1?

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in-
> (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
> (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

5. Claims 1, 3, 8-10, and 15-17, are rejected under 35 U.S.C. 102(b) as being anticipated by Yamamoto et al. (U.S. Pat. 5,897,296).

Yamamoto et al. in Figure 1 disclose a control apparatus for a linear compressor comprising a collision detection unit (generally shown in Figure 1) for detecting collision of a piston (12a) with a valve (15, 16), and a driving force control section (16a, see column 4 lines 5-25 computer processing and calculation) for determining whether the collision of the piston occurs on the basis of an output signal from the collision detection unit (Figure 1) – see abstract, column 3 lines 1-44, column 5 lines 3-20, column 6 lines 22-42, column 9 lines 5-52, and column 11 lines 5-29. The apparatus includes a displacement detecting section (14a) for

determining the position of the piston, and an upper dead point position (peak amplitude) detecting section (15a) for detecting the pistons upper dead point position, which is compared to a preset upper dead point reference valve (31). The driving force control section (16a) is analogous to the claimed inventions control unit, and it resets the maximum amplitude data of the piston of the linear compressor when collision occurs – see column 9 lines 6-52, and column 11 lines 5-39. The control apparatus further comprises a compressor-driving unit (13a) for controlling the maximum amplitude of the piston of the linear compressor under the control of the driving force control section (16a).

The collision control apparatus of Yamamoto et al. is designed to prevent collision and damage of the intake valve (15) and the ejector valve (16) in the cylinder (11) due to the collision of the piston (12a) with the top of the cylinder (11) – see column 15 lines 51-53.

A piston/compressor driving unit (13a), which is analogous to the claimed inventions compressor-driving unit, controls the maximum amplitude of the piston of the linear compressor under the control of the driving force control section (16a).

The control circuit of the Yamamoto et al. apparatus comprises an amplitude control means (30) primarily consisting of an amplifier (32) which compares an upper dead point position signal from the upper dead point position calculation means (28) with an upper dead point reference value (31) stored in memory in the inverter control means (29) and changes an output voltage amplitude for the base drive circuit (26) in proportion to a difference between them - see column 10 lines 43-58.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 2, 6, 18, 20, 21, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al. as applied in claim 1.

With respect to claim 2, Yamamoto et al. makes several references to memory and data storage, for the upper dead point reference value column 3, lines 25-44, and for other data

column 19 lines 18-19. It is inherent that any complex computer or data processor would have some sort of data storage unit. Since the computer in this situation is a compressor collision control unit, vast amounts of data are needed, computed and updated. Memory storage that is non-volatile and capable or data reading/writing is inherent in a stable and dynamic control system. It is also inherent that the different pieces of data, being separate and pertain to different components, are stored on a first, second, third, and so on, memory storage unit. The term "unit" is interpreted as a specific section or location on a storage device that is comprised of a vast plurality of memory "units."

With respect to claims 6, 18, 20, 21, and 27, Yamamoto et al., due to the disclosure of the apparatus of claim 1, inherently disclose a method of controlling a linear compressor comprising, a) presetting a maximum amplitude of a piston of the linear compressor (the amplitude of the piston is preset given a preset input, i.e. a preset driving force an frequency at the startup of the compressor) detecting a signal when the linear compressor operates (displacement detecting unit 14a), c) determining whether any collision of the piston has occurred on the basis of the detected signal (comparing and making calculations with the signal from section 14a and 15a, a preset top dead center reference value 31), d) resetting the maximum amplitude if it is determined that a collision of the piston has occurred (control and drive sections 16a and 13a respectively), and e) driving the linear compressor according to the reset maximum amplitude (driving section 13a). Refer to the cited sections above for specific details. When a collision is detected, i.e. when the upper dead point position (from 15a) exceeds the upper dead point reference value (31), the driving force, frequency, and therefore the maximum driven amplitude of the piston is reduced and reset to a different value – see column 9 lines 16-27, and column 11 lines 6-22.

Allowable Subject Matter

8. Claim 5 is allowed.

9. Claims 4,11-14, and 22-26 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. Claims 7 and 19 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Response to Amendment

11. The objection to the drawings, and to the specification (title) have been withdrawn.

12. The 35 U.S.C. 112 rejections to claims 2-6 have been withdrawn.

Response to Arguments

13. The applicant agues that the Yang (6,176,683 B1) device detects collision with a collision detection means that measures vibrations within the compressor, which are associated with collision. This is in contract to the claimed invention, which measures collision based on an comparison with the position and top dead center position of the piston and a maximum position amplitude reference value. The examiner concurs on the difference of the two inventions and withdraws the rejections based on Yang. New rejections have therefore been made using new

prior art. As such, this office action is non-final to afford the applicant the opportunity to respond to the new grounds of rejection.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references are cited to further show the state of the art with respect to collision detection and control systems for linear compressors/motors.

U.S. Pat. App. 2002/0064461 A1 to Yoo et al.

U.S. Pat. 6,074,172 to Huang

Contact Information

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Sayoc whose telephone number is (703) 305-0054. The examiner can normally be reached on M-F 8 A.M. - 6 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Thorpe can be reached on (703) 308-0102. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9302 for regular communications and (703) 872-9303 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0861.

Emmanuel Sayoc
Patent Examiner
Art Unit 3746

CHERYL J. TYLER
PRIMARY EXAMINER

ECS
April 17, 2003